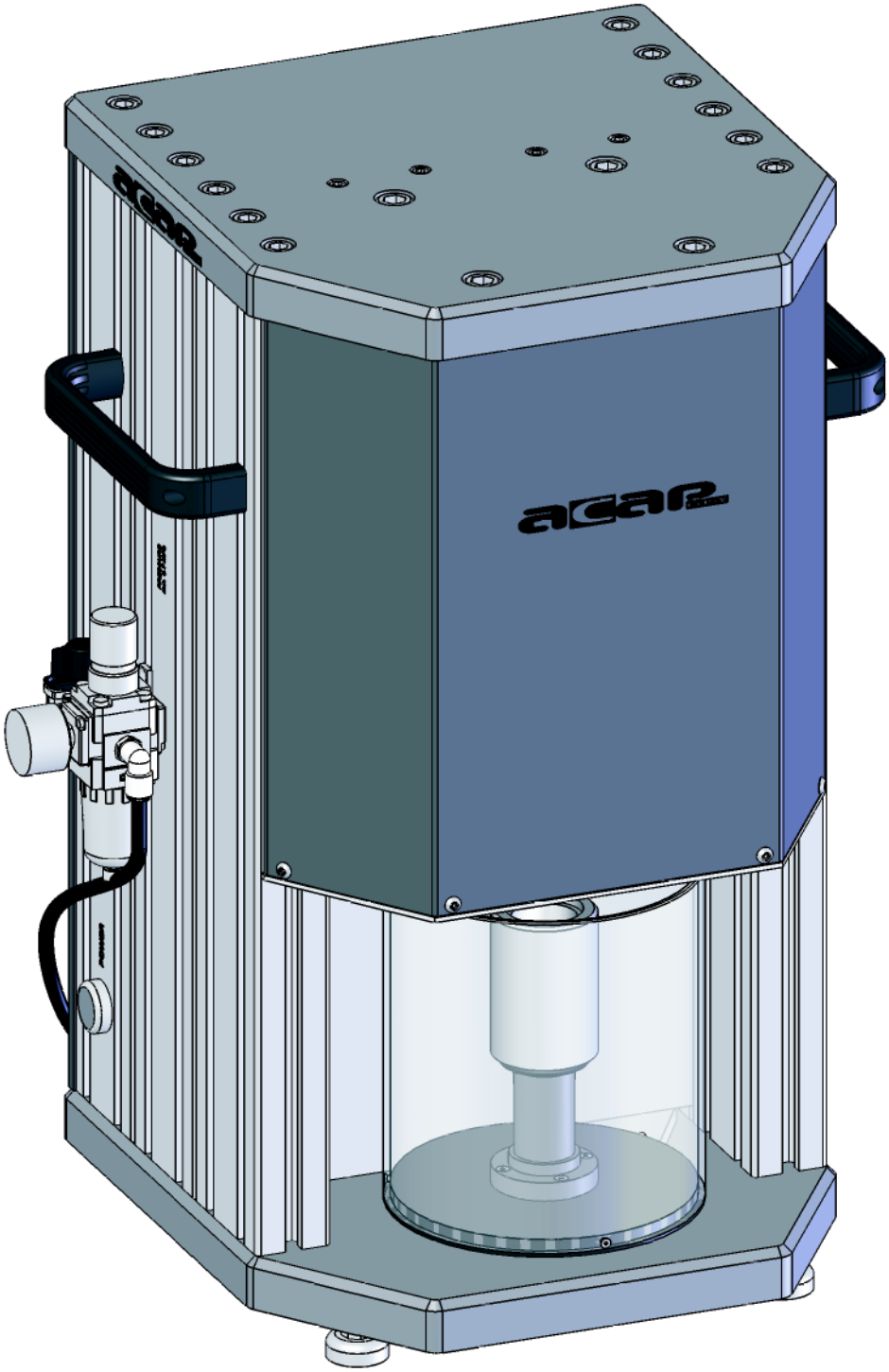
ACAP EASY USER MANUAL



AMT-Systems Oy

Automated Manufacturing and Testing Systems Oy

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1. Introduction

This manual is meant to be used with ACAP EASY serial number 020.

ACAP EASY is designed for quick measurement of caking tendency of fertilizer granules. Also it is possible to use ACAP EASY as a press.

Machine is controlled by PC driven program. Program controls cylinder movement, collect results, does the required calculations and print results.

1.1. Technical data

- accuracy of length measurement	< 0,2mm
- maximum force	8,6kN
- accuracy of the load cell	+/- 0,2%
- air consumption	6 bar/ 150 l/min
- electrical connection, the unit	230 VAC/50Hz/1A
- weight, the main unit	<60kg
- dimensions, the main unit (depth, width, height)	395mm x 485mm x 660mm
- mounting on the table with load capacity	>200kg
- recommended table size (depth, width, height)	900mm x 1800mm x 750-800mm
- room temperature	+17…+25 Celsius
- humidity	nominal 40%RH
- sample volume	approximately 45ml

- computer requirements:
  - Microsoft Windows XP (SP2) operating system
  - Microsoft .NET Framework 2.0 or later (required for User's Guide installation)
  - Intel Pentium III class processor, 500 MHz or higher
  - Video display-800 x 600, 256 colors or greater
  - Minimum of 512 MB of RAM (1024 MB or higher recommended)
  - Minimum of 25 MB of free hard disk space
  - Measurement Computing USB Data Acquisition hardware, included in delivery
  - Measurement Computing's InstaCal program, included in delivery
  - Microsoft-compatible mouse

2. Structure and main parts

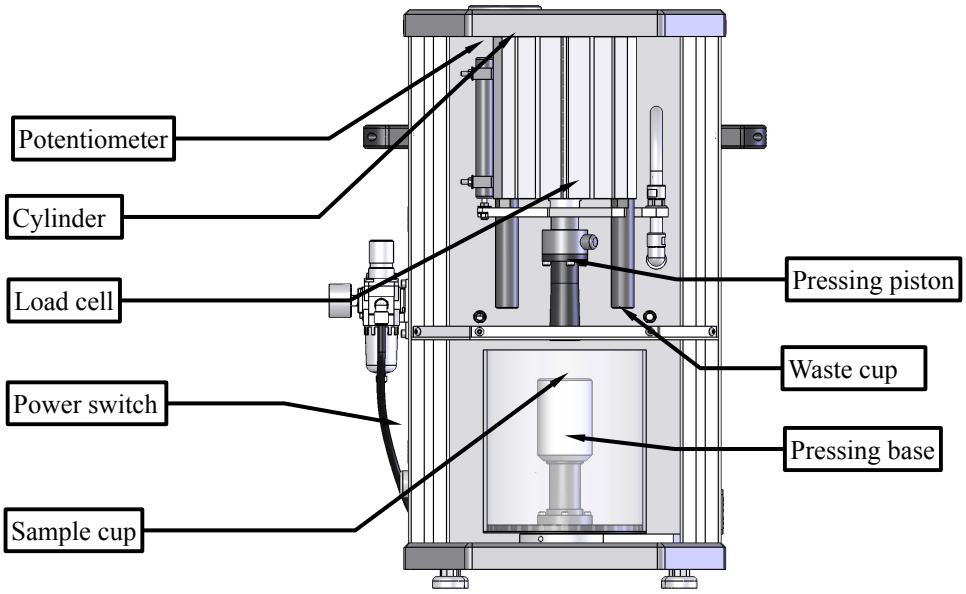


Image 1:Upper cover opened

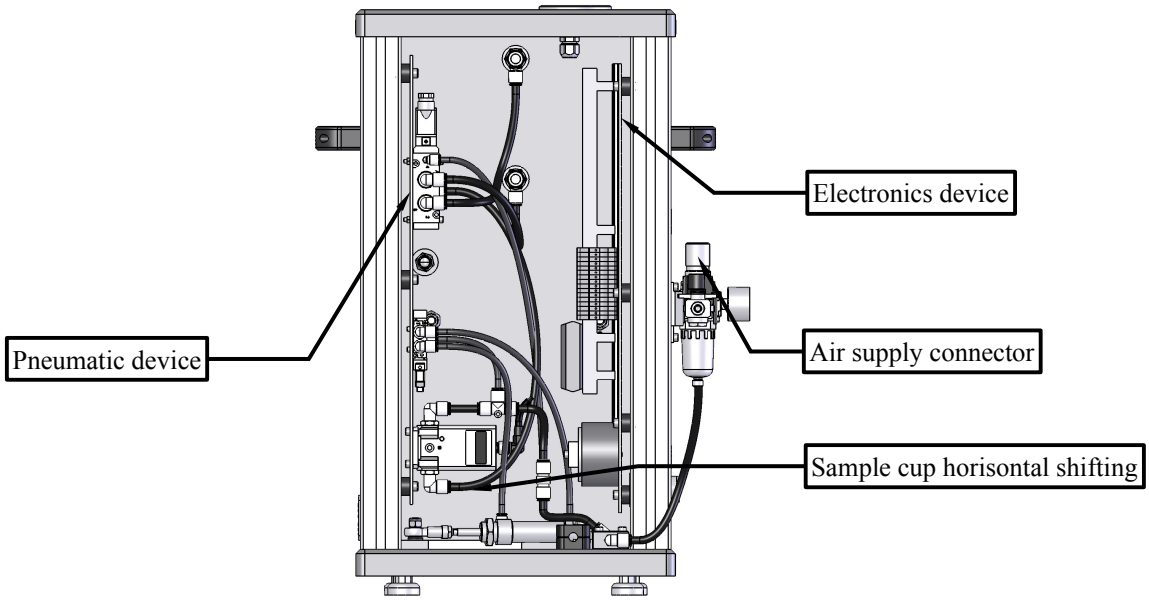


Image 2:Back cover opened.

3. Use instruction

3.1. Before start

1. A computer with following requirements is needed (if not included in delivery):
   Microsoft Windows XP (SP2 or SP3) operating system
   Microsoft NET Framework 2.0 or later (required for User's Guide installation)
   Intel Pentium III class processor, 500 MHz or higher
   Video display-800 x 600, 256 colors or greater
   Minimum of 512 MB of RAM (1024 MB or higher recommended)
   Minimum of 25 MB of free hard disk space
   Microsoft-compatible mouse

2. Also with delivery coming:
   ACAP e analyzer
   ACAP e software installation CD including:
      Measurement Computing USB Data Acquisition hardware inside **ACAPe**
      Measurement Computing's InstaCal program

3. For hardware:
   Dry and clean air connection minimum 7bar and 150 l/min, connector for 12mm ID hose with delivery.
   The 1-phase 230V 50Hz electrical supply, total amperage depends on PC.
   Recommended table size (depth × width × height) 900mm × 1800mm × 750-800mm.
   Room temperature +17…+25 °Celsius, humidity nominal 40 %RH.
   Mounting on the table with load capacity >200kg minimum.

3.2. Starting up ACAP e

1. Connect mouse, keyboard, screen and power cables to PC and **ACAPe** unit.
2. Update PC with **Windows Update Framework 2.0** (if PC included then already installed)**.**
3. Install **ACAPe** and after that **InstaCal** software's (if PC included then already installed).
4. Connect the USB cable between **ACAPe** and the computer.
5. Connect **ACAPe** power cables to power plugs.

6. Connect air pressure tube to ACAP EASY 12mm ID hose and open the red reg. valve.
7. Check that air pressure is 0,6 ± 0,01 MPa from pressure gauge and if necessary set the pressure manually with regulator.
8. Configure the USB I/O box using **InstaCal** program (see page 12).
9. Start **ACAPe** software.
10. Do force calibration (see page 13).

11. Do length calibration (see page 15).
12. Start measurement.

3.3. Automated caking tendency test

1. Take off whole waste cup device from the unit (Image 3).
2. Lift sample cup off the pressing base (Image 4).
3. Take also the movement limiter with O-ring off (Image 4).
4. Clean all these parts fully clean.
5. Reassemble parts back.

6. Put the sample into the sample cup, maximum 45ml (Image 5).
7. Lift whole waste cup device on its place. Note, the unit will not run if the waste cup device is not on its own place. Inductive switch is activated by pressing base.

Image 3:Waste cup device

Image 4:Sample cup and movement limiter.

Image 5:Sample in cup

8. Start the measurement using

Auto button in software.

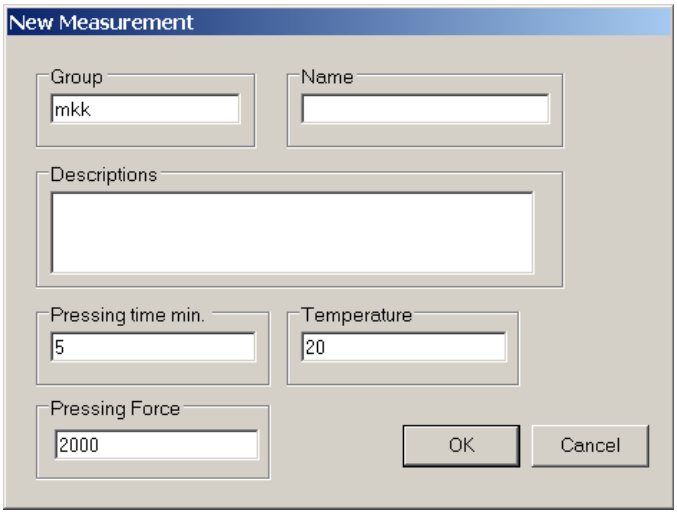


Image 6: New Measurement window

9. Change; *group*, *name*, *description* and *pressing time* (in minutes) to suit your needs, *temperature* slot does not effect measurement, but will be recorded and printed. You can use any unit of temperature (Such as Celsius, Fahrenheit, Kelvin)
10. Click ”*OK*” to start pressing sample. **Minimum time of pressing is 1 min !**
11. You can click ”Stop” at any time to end pressing
12. After cylinder has pressed the sample for given time it lifts up.
13. Now whole waste cup device is moving to the right and the piston is pressing the sample cup down. After that whole waste cup device is moving back.
14. Cylinder begins to crush the cake.

Note, you can not stop the cylinder from ”Stop” button while breaking the cake.

15. Results are recorded in database.amt file in your program directory, you can open database.amt without ACAP EASY program using a text editor such as Notepad.
16. Start the waste cup device cleaning by turning whole system downwards and shaking it same time (Image 7).

Image 7: Turning the used sample off

Image 8: Shift the sample cup off

17. When the waste cup device is turned downwards shift the sample cup off. This prevents jamming expecially with small granule sizes (Image 8).
18. End the cleaning by shining every part carefully.

3.4. Using ACAP e as a press

1. Take off whole waste cup device from the unit.
2. Lift sample cup off the pressing base.
3. Take also the movement limiter with O-ring off.
4. Clean all these parts fully clean.
5. Reassemble parts back but lift the sample cup to its lowest position.

6. Put the the device you want to press on its place (Image 9).

Image 9:Here plastic part waiting pressing

7. Lift whole waste cup device on its place. Note, the unit will not run if the waste cup device is not on its own place. Inductive switch is activated by pressing base.

8. Start the measurement using

button in software.

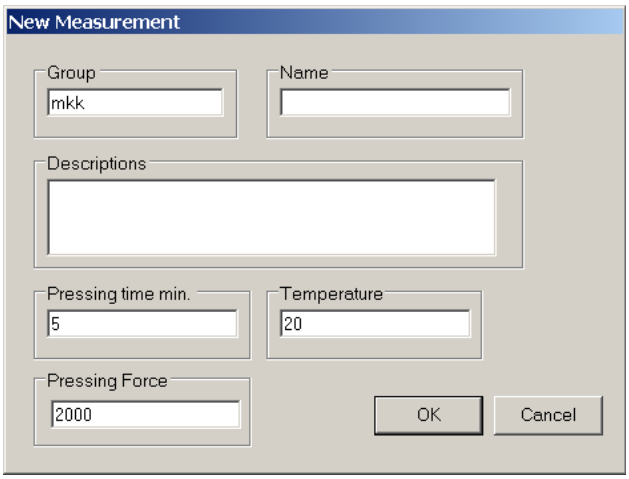


Image 10: New Measurement window

9. Change; *group*, *name*, *description* and *pressing time* (in minutes) to suit your needs, *temperature* slot does not effect measurement, but will be recorded and printed. You can use any unit of temperature (Such as Celsius, Fahrenheit, Kelvin)
10. Click ”*OK*” to start pressing. **Minimum time of pressing is 1 min !**
11. You can click ”Stop” at any time to end pressing.
12. After cylinder has pressed for given time it lifts up.
13. Results are recorded in database.amt file in your program directory, you can open database.amt without ACAP EASY program using a text editor such as Notepad.

Note, you can not stop the cylinder from ”Stop” button while pressing.

4. Program functions

1. Double click ” ACAP EASY” on Windows desktop to start the analyse program. The screen program open into.

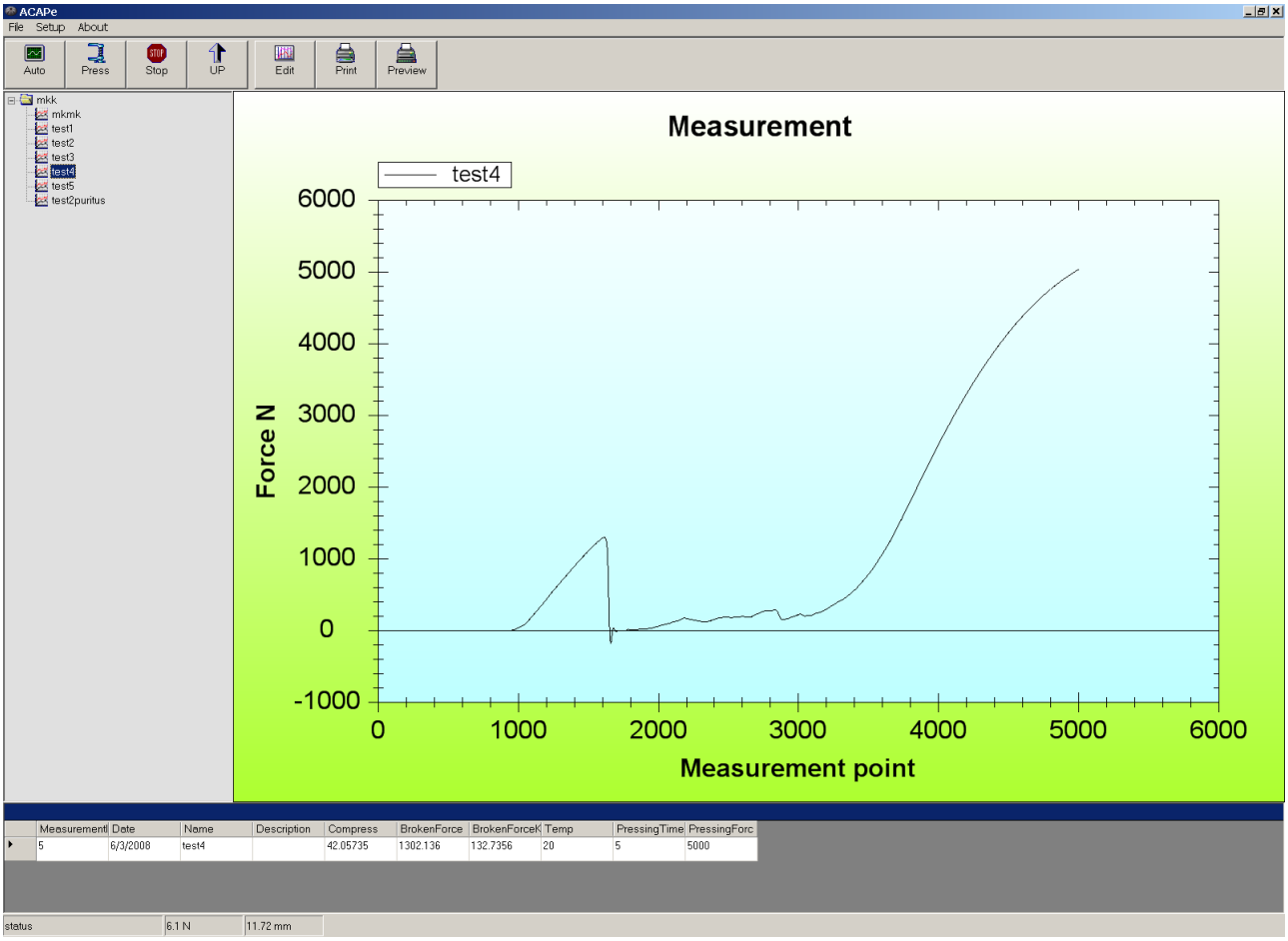
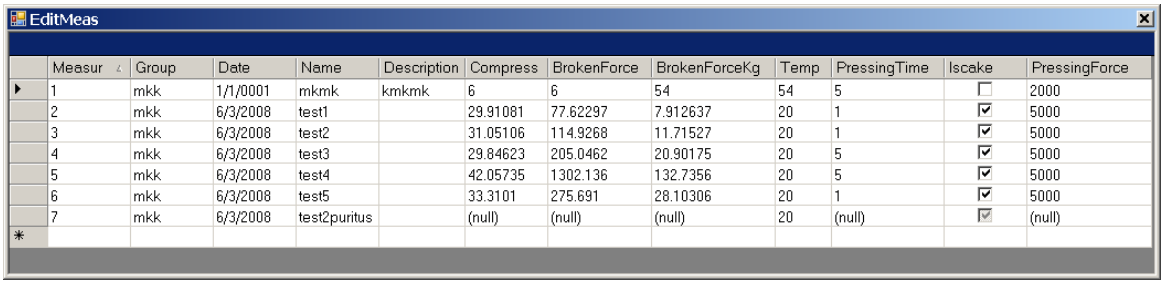


Image 11:

2. Clicking

button will lift the cylinder up.



Measur	Group	Date	Name	Description	Compress	BrokenForce	BrokenForceKg	Temp	PressingTime	Iscake	PressingForce
1	mkk	1/1/0001	mkmk	kmkmk	6	6	54	54	5	☐	2000
2	mkk	6/3/2008	test1		29.91081	77.62297	7.912637	20	1	☑	5000
3	mkk	6/3/2008	test2		31.05106	114.9268	11.71527	20	1	☑	5000
4	mkk	6/3/2008	test3		29.84623	205.0462	20.90175	20	5	☑	5000
5	mkk	6/3/2008	test4		42.05735	1302.136	132.7356	20	5	☑	5000
6	mkk	6/3/2008	test5		33.3101	275.691	28.10306	20	1	☑	5000
7	mkk	6/3/2008	test2puritus		(null)	(null)	(null)	20	(null)	☑	(null)

3. You can edit measurement data by clicking

icon.

4. You can see a print preview by clicking

icon

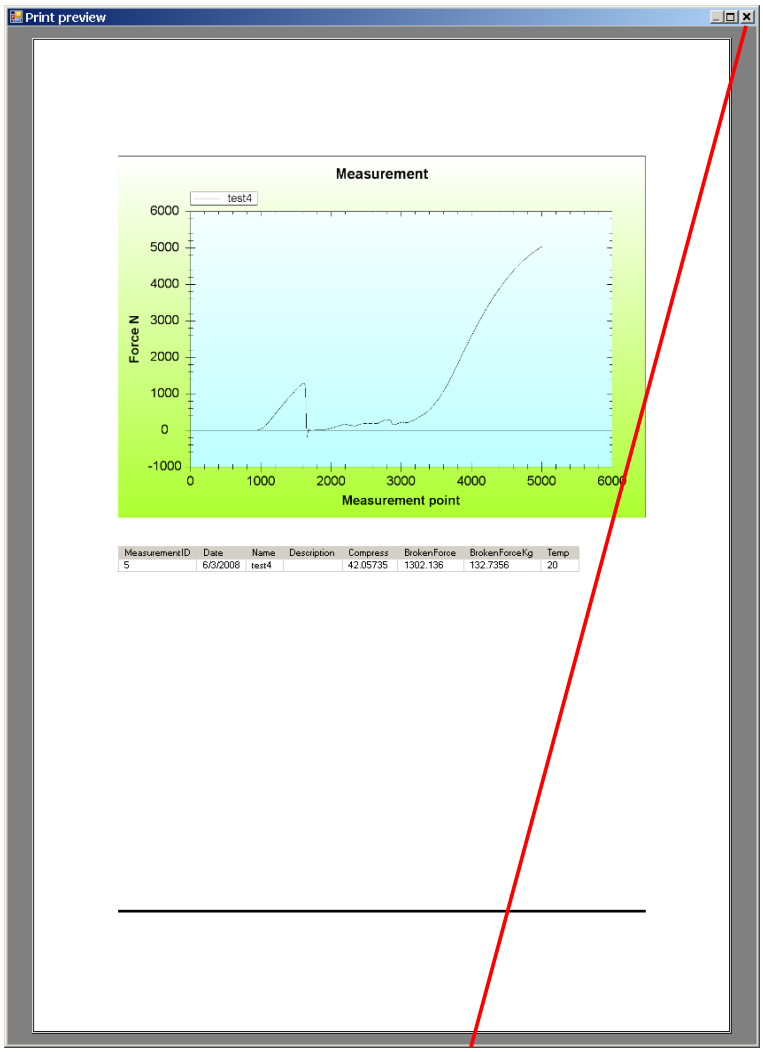
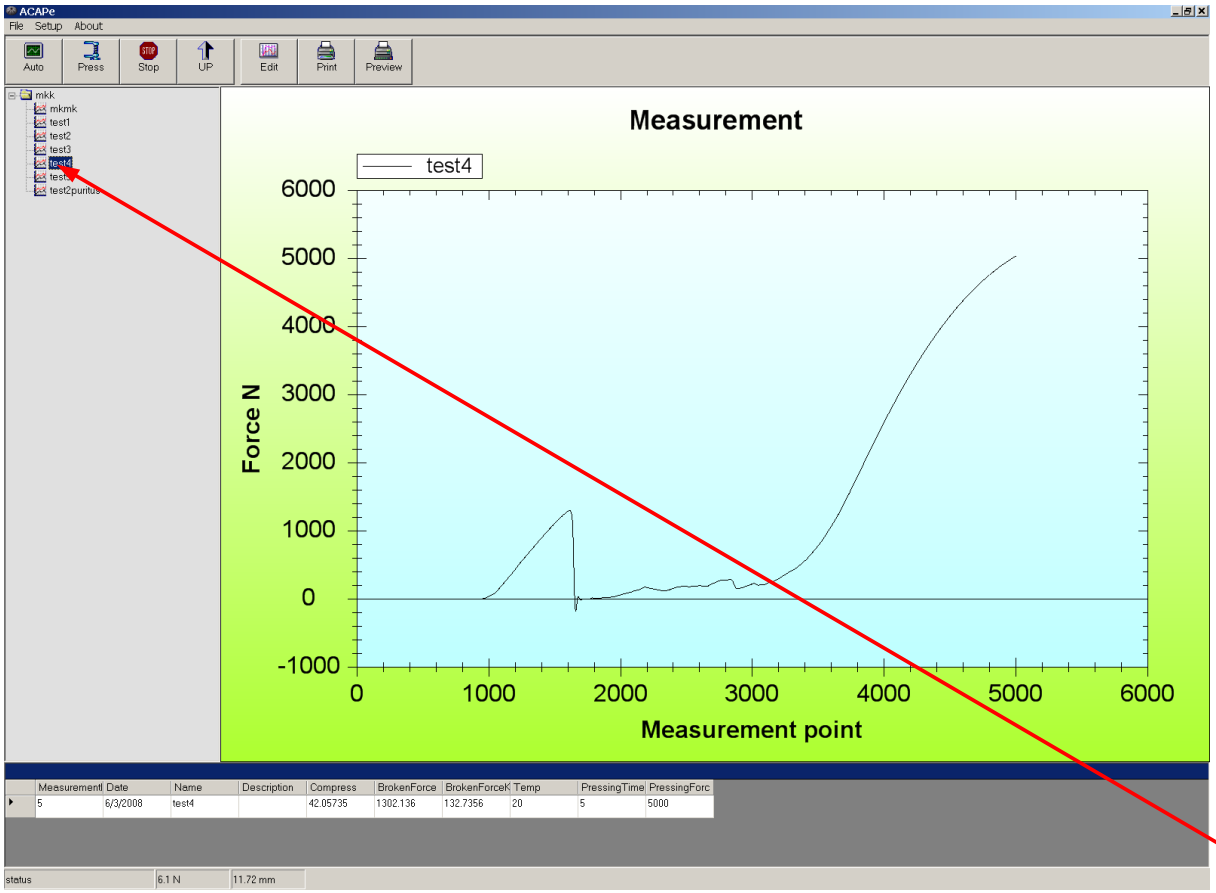


Image 12: Close print preview from ”x” icon

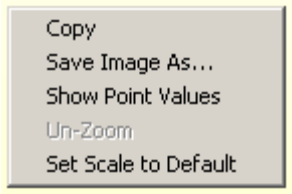


5. Clicking

will print selected measurement on your default printer, if you haven't selected a measurement the program will ask you to select. Select 1 measurements to print from list here

6. To close program select File from top menu and click "Exit"

7. Clicking the right mouse button in the Measurement area open this menu

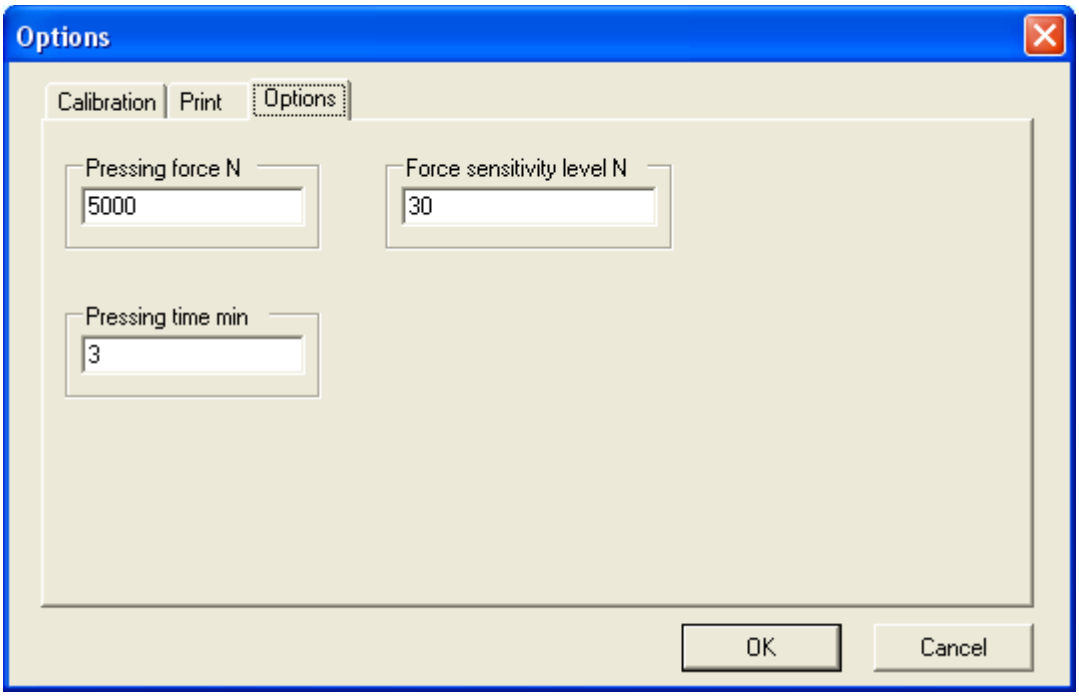


Copy:	You can copy the selected measurement diagram to your clipboard.
Save Image As:	You can save selected measurement diagram image in .PNG format.
Show Point values:	Shows the point values of given measurement when mouse cursor is over the point.
Un-Zoom:	Zooms out the measurement diagram.
Set Scale to Default:	Zooms measurement diagram view to default.

8. Zoom

You can Zoom in by clicking and holding down left mouse button while moving mouse so that it creates a box

9. Clicking "options" in the setup at the top menu open this window



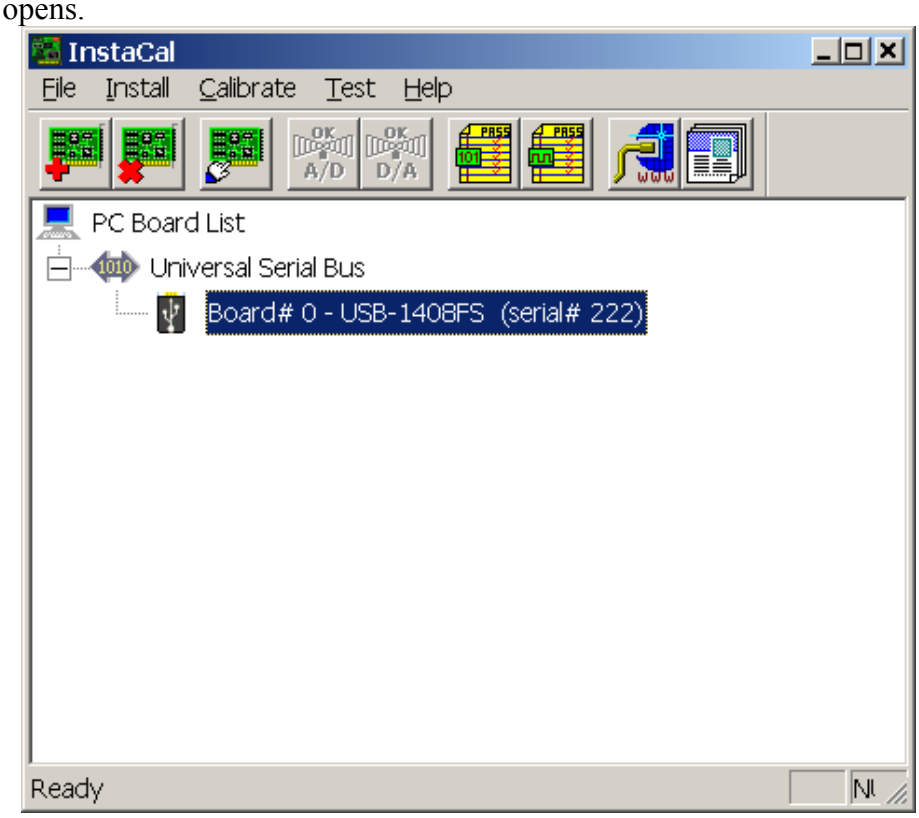
In the options tab you can change Pressing force and Force sensitivity level.
Changing ”Pressing force N” will change the force cylinder uses to press the sample. The 8600 Newtons is near the maximum force possible for this machine.

Changing ”Force sensitivity N” will change the amount of force needed for load sensor to detect when the test head is pressing the sample. Lower the force the more sensitive the results will be to interference such as vibration.

You should not change the values in the calibration tab.
Changing them will cause false results if not calibrated after changes.

5. InstaCal

1. Open Start menu from Windows XP.
2. Select ”Measurement Computing” from ”All programs” menu.
3. Click InstaCal.
4. Program opens.



There should be PMD-1408FS serial xxx identified (instead of DEMO-BOARD), if not.

5. Make sure usb cable is connected and ACAP`s power is on.

6. Close InstaCal program.

If that doesn’t help.

7. Insert Measurement Computing CD in your CD-drive and follow the installing instructions in the ”DAQ Software Quick Start” guide which came with the CD.

6. Maintenance

ACAP e is serviced when necessary. It does not need regular maintenance.

You have to clean sample cup, press base, waste device and press piston after every test.

6.1. Calibration

Recommended time between calibrations is 1 month.

6.1.1. Force calibration

1. Take off whole waste cup device from the unit and check that all parts are clean.
2. Lift sample cup to the lowest position (Image 13).
3. Set the adapter and the calibration load cell (optional) on its place into waste device (Image 14).
4. Lift whole waste cup device with the calibration load cell on its place (Image 15). Note, the unit will not run if the waste cup device is not on its own place. Inductive switch is activated by pressing base.

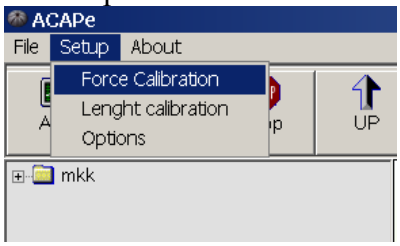
Image 13: Sample cup in lowest position

Image 14: Force calibration device on its place

Image15: Ready for force calibration

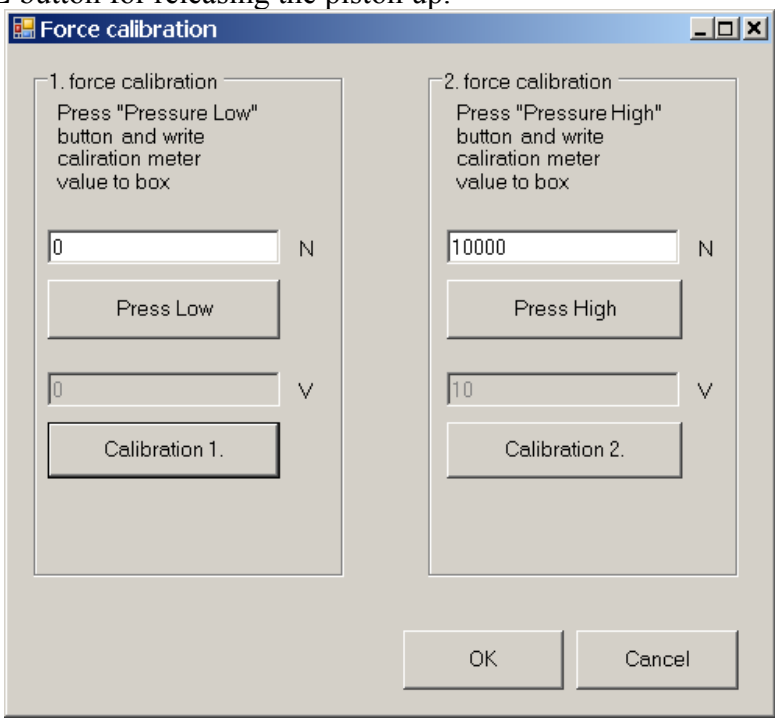
5. Turn 230VAC power on to the calibration display (optional).

6. Select “Force Calibration” from ”Setup” menu



7. Do the first calibration using **Calibration 1** force button, read the force value on calibration display and write that value into its window.
8. Use **RELEASE** button for releasing the piston up.
9. Do the second calibration using **Calibration 2** force button, read the force value on calibration display and write that value into its window.

10. Use **RELEASE** button for releasing the piston up.



6.1.2. Length calibration

1. Take off whole waste cup device from the unit and check that all parts are clean.
2. Lift sample cup to the lowest position (Image 16).
3. Lift whole waste cup device on its place (Image 17). Note, the unit will not run if the waste cup device is not on its own place. Inductive switch is activated by pressing base.

Image 16: Sample cup in lowest position

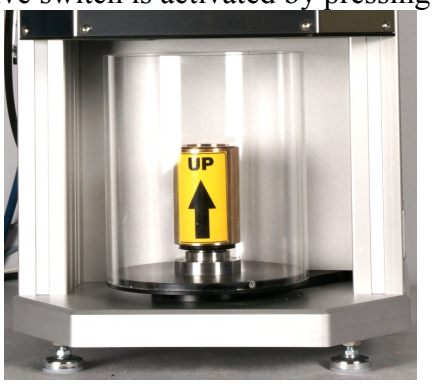
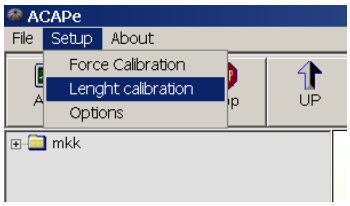
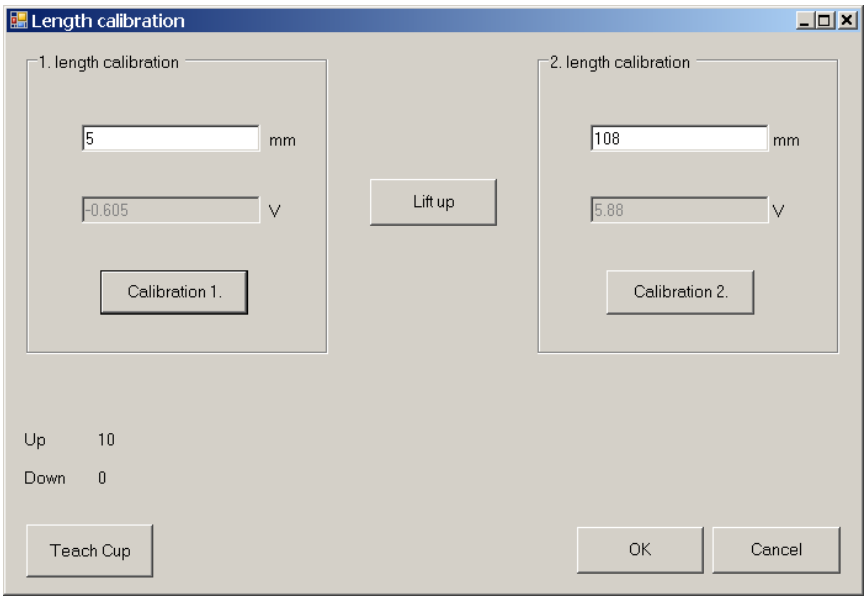


Image 17: Ready for first length calibration

4. Select “Length Calibration” from ”Setup” menu and do the 1. calibration 0 mm.





5. Write 0 in edit box 1 and click **Calibration 1**. Now the 1. length calibration is done.
6. Take off whole waste cup device from the unit and check that all parts are clean.
7. Lift sample cup to the lowest position.

8. Set the length calibration piece on its place (Image 18)

Image 18: Calibration device on its place

9. Lift whole waste cup device on its place (Image 19). Note, the unit will not run if the waste cup device is not on its own place. Inductive switch is activated by pressing base.

Image 19: Ready for 2. length calibration

10. Write the existing length in edit box 2 and click **Calibration 2**. Now the 2. length calibration is done.

6.1.3. Teach Cup

1. Take off whole waste cup device from the unit and check that all parts are clean.
2. Lift sample cup to the lowest position (Image 20).
3. Lift whole waste cup device on its place. Note, the unit will not run if the waste cup device is not on its own place. Inductive switch is activated by pressing base.

Image 20: Sample cup in lowest position

4. Press button .
5. Click ”OK” to end calibration.
6. “Teach Cup” calibration is done.

7. Spare part information

7.1. Drawing: SPARE PART 1, Main Assy

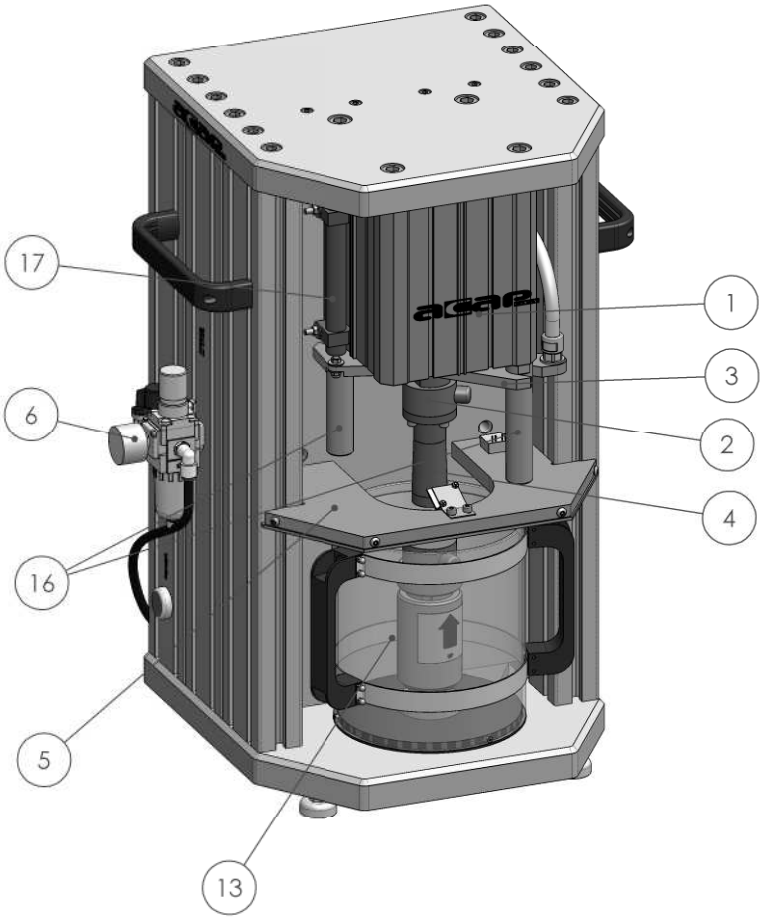
No.	Part	Supplier/manufacturer	Details
1	CYLINDER	SMC	CDQ2B140-100DC
2	LOAD CELL	GEFRAN	TU-K1M
3	ROTATION REJECTOR	AMT-Systems Oy	
4	PRESS PISTON	AMT-Systems Oy	
5	LOWER COVER	AMT-Systems Oy	
6	REGULATOR ASSY	SMC	AW20
7	SPEED VALVE	SMC	AS3201F-03-08S
8	CONNECTOR	SMC	KQ2T08-06
9	CONNECTOR	SMC	KQ2L08-02
10	SPEED VALVE	SMC	AS2201F-01-06S
11	PNEUMATICS		SPARE PART 2
12	SHIFTER	AMT-Systems Oy	
13	WASTE DEVICE		SPARE PART 3
14	CYLINDER	BOSCH	Ø20 / 25 0 822 333 502 MNI
15	CYLINDER END	BOSCH	M8
16	AXIS	AMT-Systems Oy	
17	POTENTIOMETER	GEFRAN	PZ34-S-100

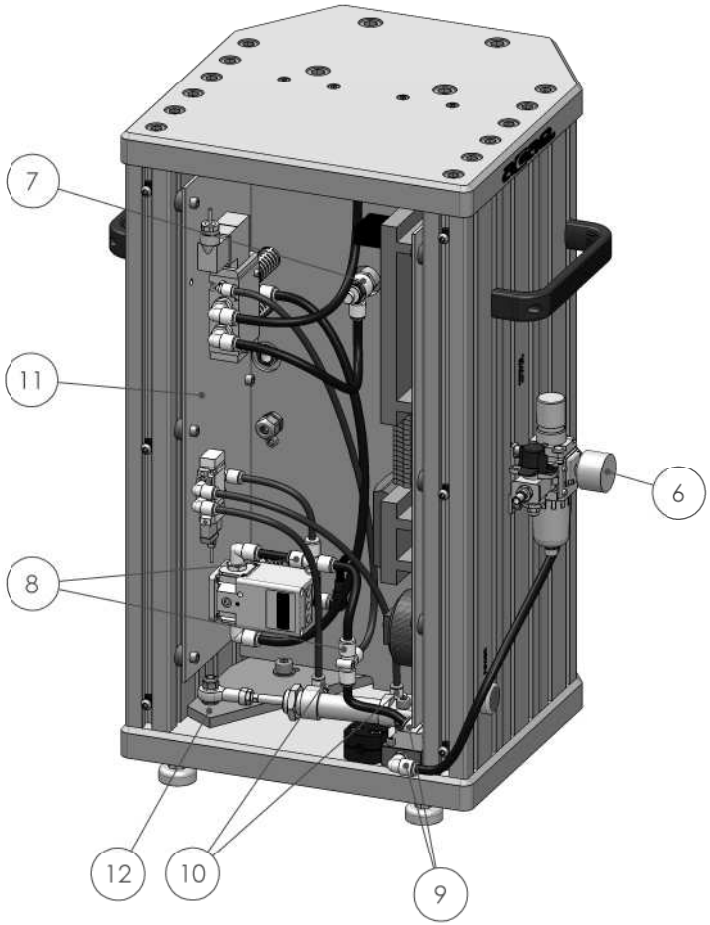
7.2. Drawing: SPARE PART 2, Pneumatics

No.	Part	Supplier/manufacturer	Details
1	VALVE	SMC	SY5120-5LOU-01F
2	ELECTRONIC REGULATOR	SMC	ITV2050-31F3N3-Q
3	CONNECTOR	SMC	KQ2L08-03
4	SILENCER	SMC	AN200-02
5	CONNECTOR	SMC	KQ2L06-01
6	SILENCER	SMC	SFE303102
7	VALVE	SMC	EVFS3120R-5YZB-03F
8	CONNECTOR	SMC	KQ2L06-M5

7.3. Drawing: SPARE PART 3, Waste device

No.	Part	Supplier/manufacturer	Details
1	WASTE TUBE	AMT-Systems Oy	
2	WASTE BOTTOM	AMT-Systems Oy	
3	PRESSING BASE	AMT-Systems Oy	
4	SAMPLE CUP	AMT-Systems Oy	
5	DISC	AMT-Systems Oy	
6	O-RING		OR 41,28 x 3,53
7	O-RING		OR 30 x 3





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				HITSAUS:	SFS 3393-	-	
	MASSA - kg	NIMI MAIN ASSEMBLY	TYÖOHJE - PINTAKÄS. -				
			REV.	PÄIVÄMÄÄRÄ	SUUN.	TARKASTANUT / MUUTOS	
LUOTTAMUKSELLINEN / CONFIDENTIAL TÄMÄN PIIRUSTUKSEN SISÄLTÖ ON AMT-SYSTEMS OY:N OMAISUUTTA. MUOKKAAMINEN JA UUDELLEENKÄYTTÖ ILMAN AMT-SYSTEMS OY:N KIRJALLISTA SUOSTUMUSTA KIELLETTY!	MITTAKAAVA 1:5	PIIRUSTUSNRO SPARE PART 1	0	2011-10-04	-	0000-00-00	
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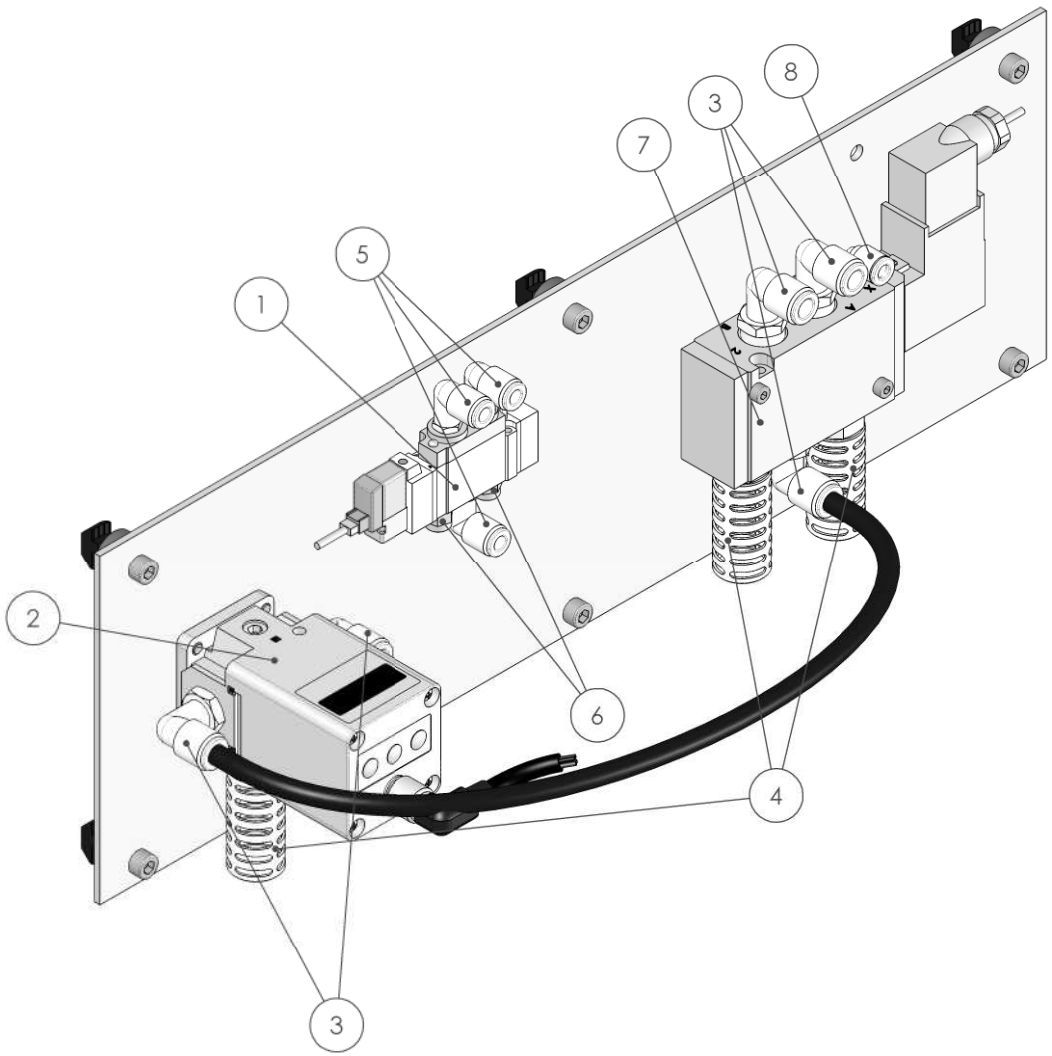

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TÄMÄN PIIRUSTUKSEN SISÄLTÖ ON AMT-SYSTEMS OY:N OMAISUUTTA. MUOKKAAMINEN JA UUDELLEENKÄYTTÖ ILMAN AMT-SYSTEMS OY:N KIRJALLISTA SUOSTUMUSTA KIELLETTY!

HUOM!

MASSA	- kg
MITTAKAAVA	1:2
TUOTE	ACAP EASY
NIMI	PNEUMATIC
PIIRUSTUSNRO	SPARE PART 2
	SHEET 1/1

TOLERANSSIT MITAT: ISO 2768- -
HITSAUS: SFS 3393- -
TYÖOHJE -
PINTAKÄS. -

REV.	PÄIVÄMÄÄRÄ	SUUN.	TARKASTANUT / MUUTOS
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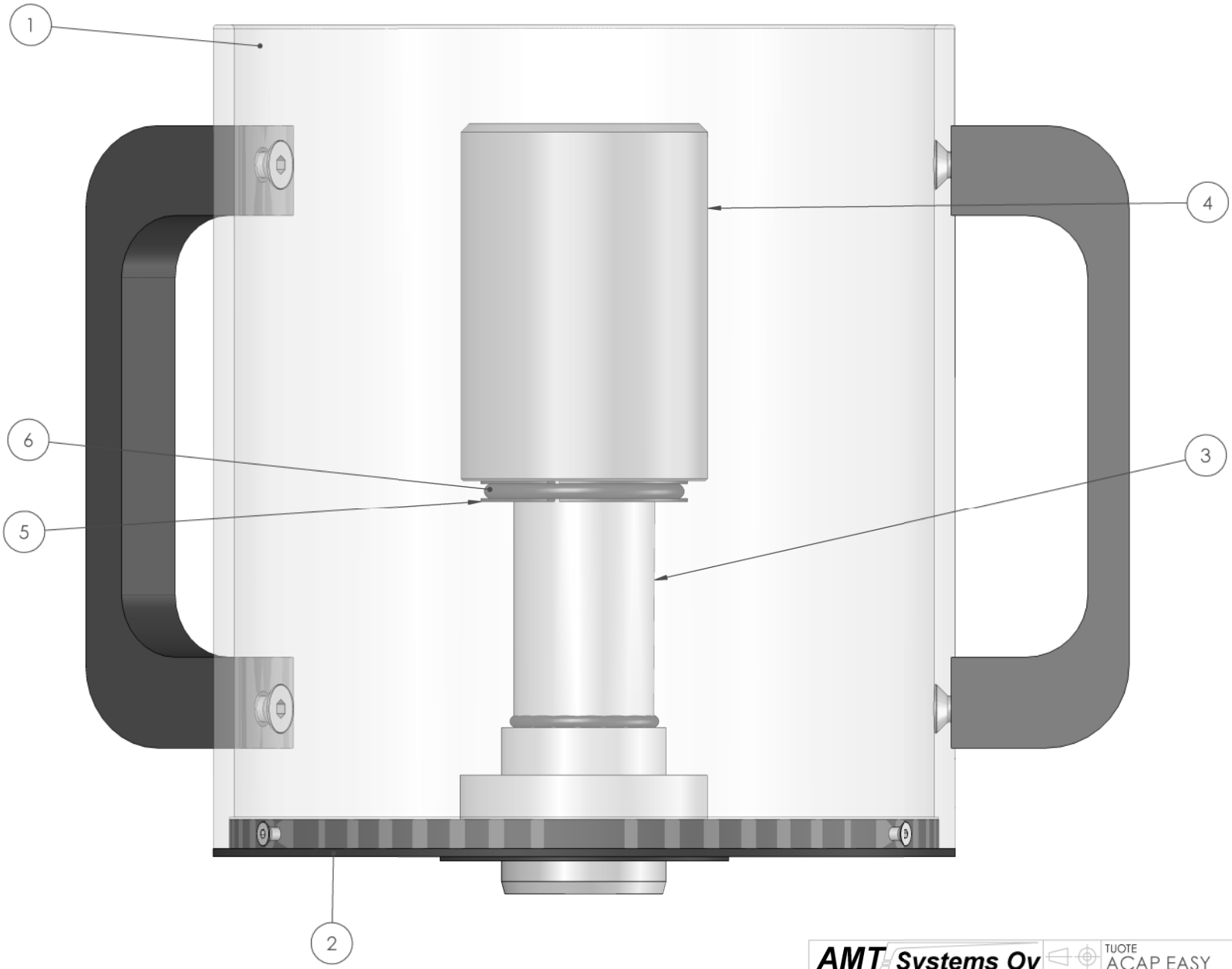

AMT Systems Oy

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LUOTTAMUKSELLINEN / CONFIDENTIAL

TÄMÄN PIIRUSTUKSEN SISÄLTÖ ON AMT-SYSTEMS OY:N OMAISUUTTA. MUOKKAAMINEN JA UUDELLEENKÄYTTÖ ILMAN AMT-SYSTEMS OY:N KIRJALLISTA SUOSTUMUSTA KIELLETTY!

HUOM!

MASSA	- kg
MITTAKAAVA	1:1
TUOTE	ACAP EASY
NIMI	WASTE DEVICE
PIIRUSTUSNRO	SPARE PART 3
	SHEET 1/1

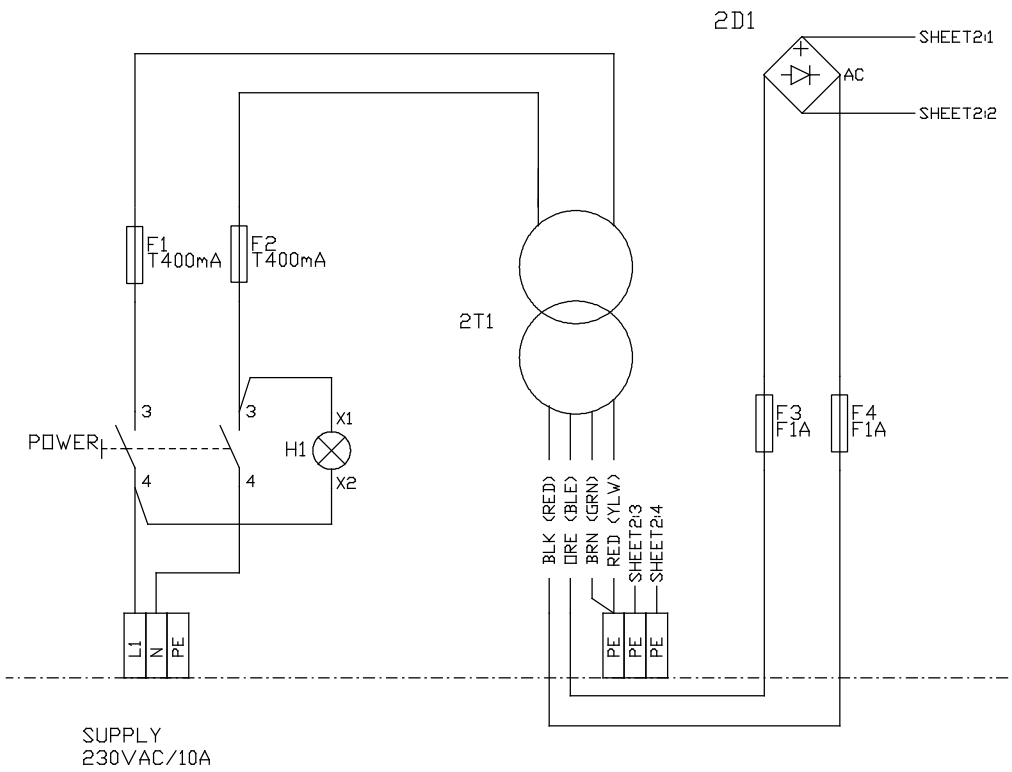
TOLERANSSIT MITAT: ISO 2768- -
HITSAUS: SFS 3393- -

TYÖOHJE -
PINTAKÄS. -

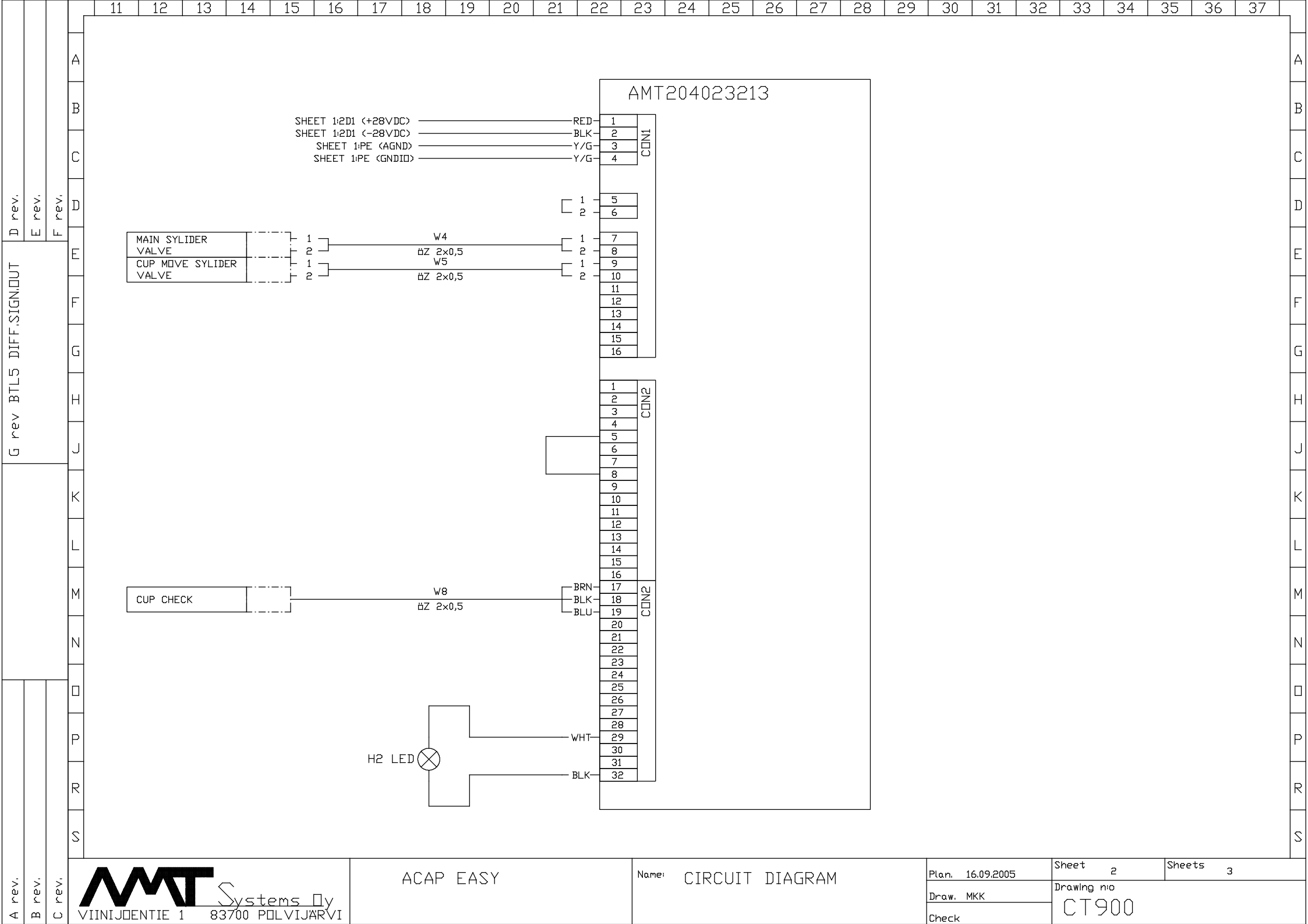
REV.	PÄIVÄMÄÄRÄ	SUUN.	TARKASTANUT / MUUTOS
0	2011-10-04	-	0000-00-00
-	-	-	-
-	-	-	-
-	-	-	-

7.4. Drawing: ACAP EASY 900, Electrical parts

No.	Part	Supplier/manufacturer	Details
01	Electric card	AMT-Systems Oy	
02	Fuse		400mA
03	Fuse		800mA
04	*Terminal* block		
05	USB-card		PDM 1208FS
06	Transformer		230/2x18V
07	Trail		



AMT Systems Oy VIINIJÖENTIE 1 83700 PÖLVIJÄRVI	ACAP EASY	Name: POWER SUPPLY	Plan. 16.09.2005 Draw. MKK Check	Sheet 1	Sheets 3 Drawing nro CT900



D rev.
E rev.
F rev.
G rev BTL5 DIFF.SIGNOUT
A rev.
B rev.
C rev.

AMT Systems Oy
VIINIJÖENTIE 1 83700 PÖLVIJÄRVI

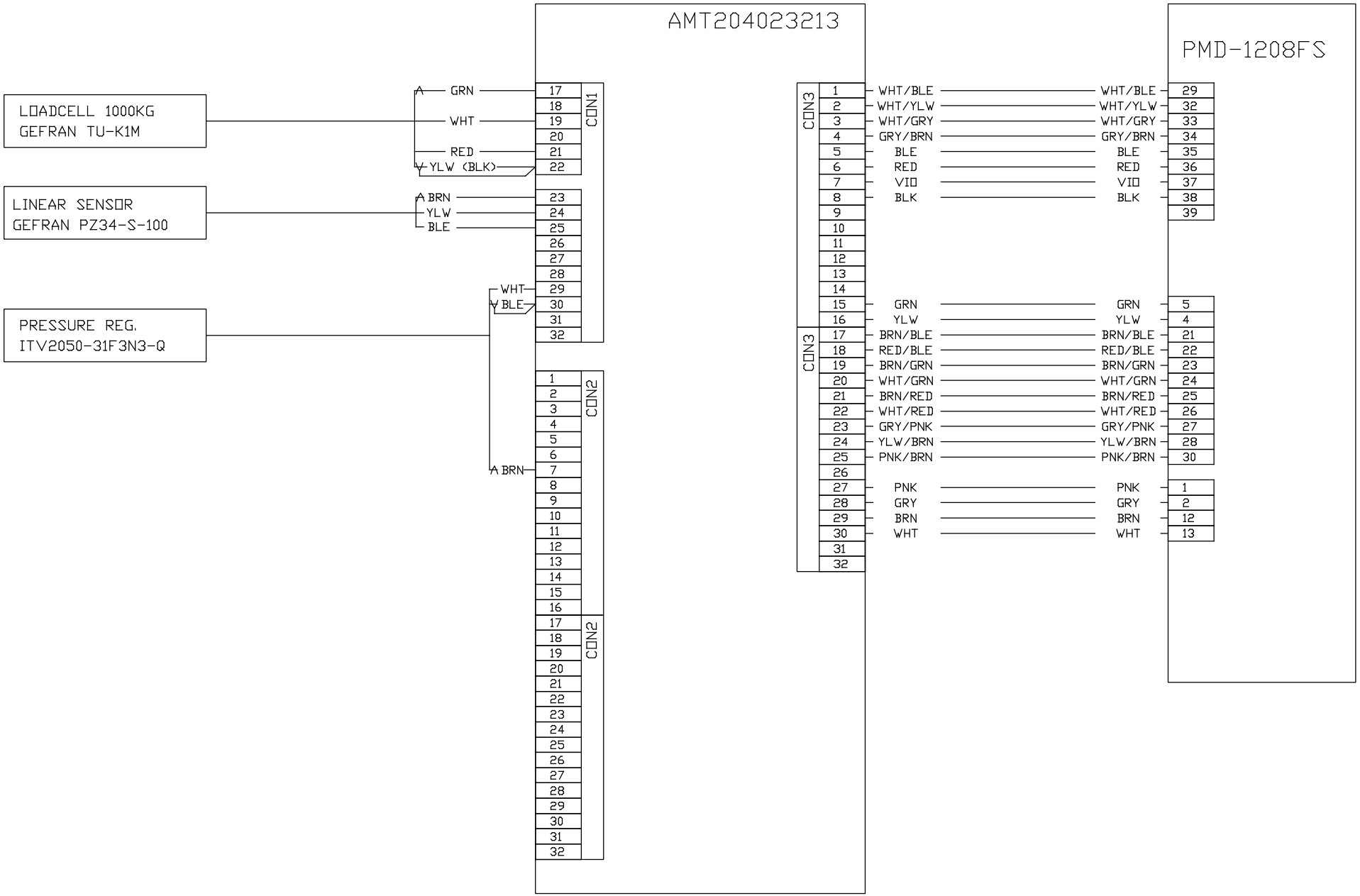
ACAP EASY

Name: CIRCUIT DIAGRAM

Plan. 16.09.2005
Draw. MKK
Check

Sheet 2
Sheets 3

Drawing nro
CT900



D rev.
E rev.
F rev.

A rev.
B rev.
C rev.

AMT Systems Oy
VIINIJOENTIE 1 83700 POLVIJÄRVI

ACAP EASY

Name: CIRCUIT DIAGRAM

Plan. 16.09.2005
Draw. MKK
Check

Sheet 3
Sheets 3

Drawing nro
CT900

8. Troubleshooting

Problem: Press does not reach the required strength.
Solution: Check if there is sufficient air pressure.
Adjust air pressure regulator for more pressure:
- adjust regulator by winding the screw on top
- the value in gauge should be over 6 bar

Problem: Load cell reading does not match the given force.
Solution: Check load cell calibration from the computer program
If the settings are correct and if there is need for calibration:
- check that wires leaving ACAP EASY are correctly connected
- calibrate ACAP EASY

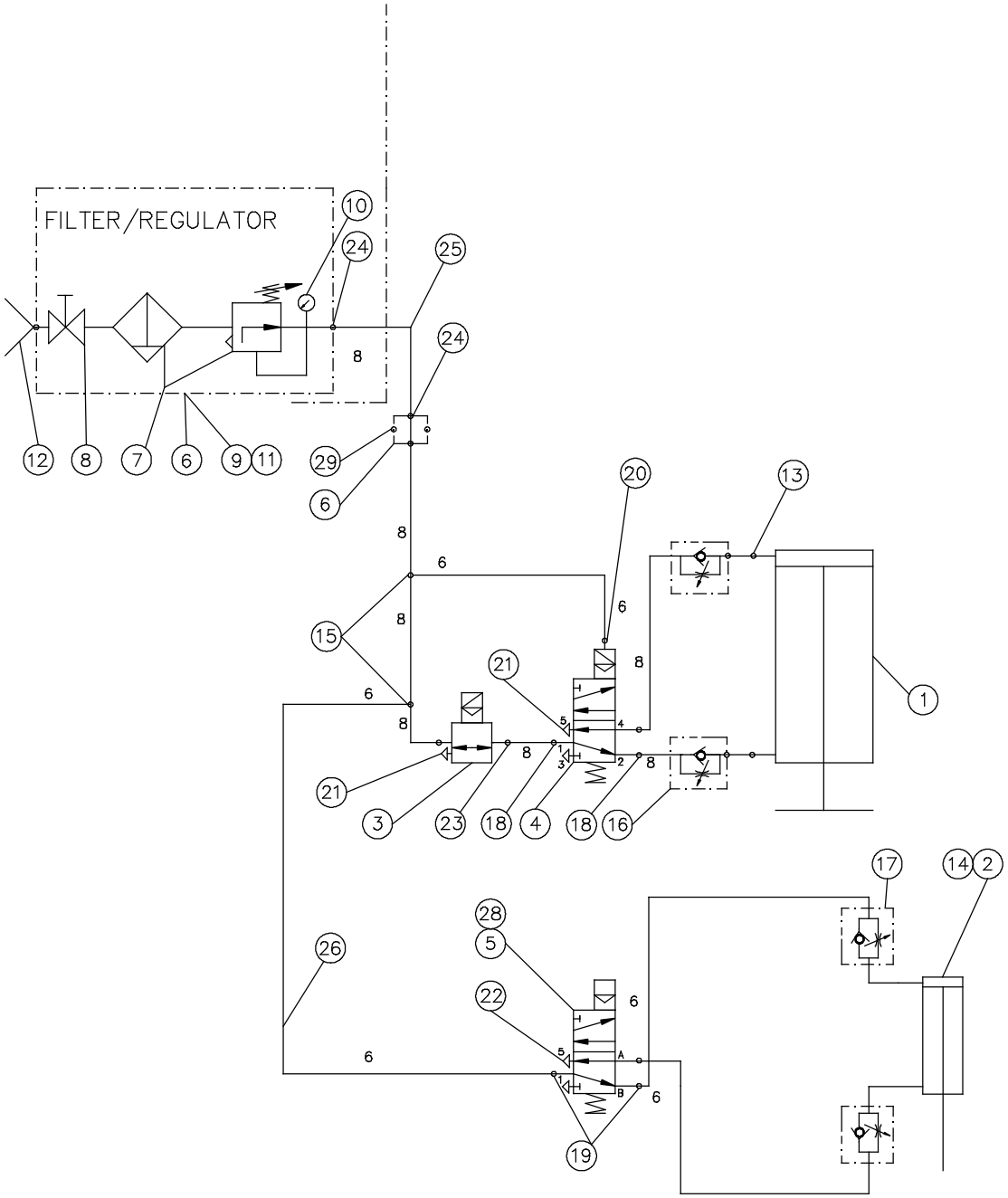
Problem: Cylinder does not move when the program order it.
Solution: Is there air pressure?
Is ACAP EASY on?
Is cable between ACAP EASY and PC connected properly?
Are settings correct in the options menu?

Problem: Measurement results are strange.
Solution: Are settings correct in the options menu?
Is cable between ACAP EASY and PC connected properly?
Calibrate ACAP EASY.

Problem: Printing to local printer does not work.
Solution: Is printer on?
Is cable between printer and PC connected properly?
Does Windows have correct printer drivers?

Problem: Printing to network printer does not work.
Solution: Is cable between network and PC connected properly?
Is network system able to receive data?

9. Pneumatic drawing ACAP e



No.	Drawing No.	Part name	Standard	Shape, measures	Material	Qty.
29	600082	PLUG	SMC	107 1/4"		4
28	180361	VALVE CABLE	SMC	SY100-68-A-6		2
27	288005	VALVE CABLE	SMC	P398020-501-3		2
26	113560	TUBE, BLACK	SMC	TU0604B-20	PU	
25	113590	TUBE, BLACK	SMC	TU0805B-20	PU	
24	116800	CONNECTOR	SMC	KQ2L08-02S		6
23	116340	CONNECTOR	SMC	KQ2L08-03S		4
22	100203	SILENCER	SMC	SFE303102		
21		SILENCER	SMC	AN200-02		
20		CONNECTOR	SMC	KQ2L06-M5		
19	116720	CONNECTOR	SMC	KQ2L06-01S		6
18	116810	CONNECTOR	SMC	KQ2L08-03S		6
17	100760	VALVE	SMC	AS2201F-01-06S		4
16	285314	VALVE	SMC	AS3201F-03-08S		4
15	117474	T-CONNECTOR	SMC	KQ2T08-06		4
14		ADAPTER	BOSCH	1822124002 M8/8		
13	600059	ADAPTER	SMC	105 3/8"-3/8"		4
12		INPUT CONNECT.	CEJN 320	1/4" MALE		
11	114739	ADAPTER	SMC	Y200T		2
10	112686	GAUGE	SMC	G36-10-01		
09	100203	SILENCER	SMC	SFE303102		2
08	400461	SHUT OFF	SMC	VHS20-F02		
07	100544	FILTER/REG	SMC	AW20-F02		2
06		ADAPTER	METW	W0501111002		
05	180105	VALVE	SMC	SY5120-5LOU-01F-Q		2
04		VALVE	SMC	EVFS3120R-5YZB-03F		
03	129385	PRESSURE VALVE	SMC	ITV2050-31F3N3-Q		
02		CYLINDER	BOSCH	0822333502 ø20/25		
01	401532	CYLINDER	SMC	CDQ2B140-100DC		2

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Notice!

Weight kg

Scale

Prod. ACAP EASY

Title ANALYZER

Drawing No. ACAP100PN NO. 017

Tolerances measures: ISO 2768-
welding: SFS 3393-

Instruct.
Finish

Rev.	Date	Desig.	Inspector / Changes
0	29.8.2011	JT	